Dermato-Venereological and Allergological Research at the University of Southern Denmark

Klaus E. Andersen and Carsten Bindslev-Jensen
Department of Dermatology and Allergy Centre, Odense University Hospital, DK-5000 Odense, Denmark.
E-mail: keandersen@health.sdu.dk

In addition to traditional dermato-venereological research the department hosts an Allergy Centre, which is based on routine collaboration between specialists from dermatology, paediatrics, pulmonary medicine, occupational medicine, oto-rhino-laryngology, clinical immunology and biochemistry. The Allergy Centre focuses on food allergies, drug reactions and complicated cases where elimination/provocation procedures are part of the patient investigation.

The research strategy includes the following areas:

- Allergic diseases in the skin, type I and type IV allergy in skin and mucous membranes
- Food allergy
- Anaphylaxis
- Clinical and experimental contact allergy, contact dermatitis
- Contact dermatitis caused by plants
- Skin toxicology
- Drug allergy
- Chronic urticaria
- Epidemiology of atopic diseases and contact dermatitis
- Paediatric dermatology with focus on hereditary skin diseases
- Autoimmune skin diseases
- Skin cancer
- Mastocytosis
- Hereditary angioedema
- Sexually transmitted diseases

Atopic dermatitis

The incidence of atopic dermatitis in the industrialized world has increased during the past 30 years. Close to 20% of newborns are affected at some time during childhood. In Denmark, 20% of 8th-grade schoolchildren have eczema. It is a chronic visible skin disease and may cause particular psychological distress in adolescence.

It is important to prevent exclusion from education and working life among adolescents with special needs such as those with atopic dermatitis. The aetiology of atopic dermatitis is multifactorial, and evaluation and treatment is individualized depending on age and severity. This is usually a multidisciplinary task and, beyond diagnosis and treatment, it also requires meticulous information and instruction to families and patients.

Two longitudinal population-based cohorts were established in 1995 (The Odense Adolescence Cohort Study, TOACS) and in 1998 (The Danish Allergy Research Cohort, DARC), respectively. The children and adolescents have been followed repeatedly over the years and the data collected has formed the basis for six PhD theses and multiple publications. The follow-up of these cohorts continues.

Prof Klaus E. Andersen at the Department of Dermatology and Allergy Center.

Carsten Bindslev-Jensen, Head of the Department of Dermatology and Allergy Center. Professor in Allergology.

Food allergy

Double-blind food challenges remain the mainstay diagnostic tool in food allergy. Research is focusing on establishing new diagnostic methods for substituting challenge. This is true in classical food allergy, as well as in the more recently described types of food allergy that we are also focusing on: food-dependent, exercise-induced anaphylaxis and allergic reactions to new food components, such as wheat hydrolysates. The department's database, containing data from more than 1,000 food challenges serves as the perfect tool for investigations into new diagnostic methods and constitutes one of the largest cohorts of food allergic patients suitable for longitudinal studies.

Drug allergy

Allergic reactions to drugs is a large and increasing problem. In contrast to food allergy, there is only rarely a gold standard for investigating these patients. In order to improve diagnostic methods, over recent years we have focused on allergic reactions to β-lactams, aspirin and non-steroidal anti-inflammatory drugs (NSAID), and to insulins in diabetic patients.

Basophil activation

Studies of the activation of basophils are carried out in patients with urticaria, drug allergy and food allergy in collaboration with the department's two adjungated professors, Marcus Maurer, Charité Berlin, and Per Stahl Skov, Copenhagen.

Contact dermatitis

Over the last 20 years contact dermatitis, hand eczema and occupational skin diseases have been 3 of the department's focus areas for research. An "Allergen Bank" has been established

as a service to dermatologists in practice. Based on a yearly subscription fee practitioners can order rare contact allergens for testing individual patients with suspected contact allergy. The Allergen Bank database contains patch test data for approximately 10,000 patients tested during the last 18 years. This is a valuable tool for clinical research.

The department is an integrated part of the National Allergy Research Centre (www.videncenterforallergi.dk) and contributes to, and performs, research in these fields at an international level. Close collaboration with the department of occupational and environmental medicine is established. A hand eczema clinic devoted to diagnosis and treatment of severe hand eczema is planned to improve the treatment results and prognosis. The horticulture industry on Funen is important, and the department has developed a particular expertise in the investigation of all forms of allergy caused by plants.

Table I. *Current research projects at the Department of Dermatology and Allergy Centre, 2011*

Projects	Participants from the department	Research area
Human contact dermatitis model	Klaus Ejner Andersen, Kristian Fredløv Mose	Contact dermatitis and occupational dermatology
Nanotechnology and contact allergy	Klaus Ejner Andersen, Jakob Torp Madsen	Contact dermatitis dermato-toxicology
Hereditary angioedema (HAE)	Anette Bygum, Anne Åbom, Sigurd Broesby Olsen	HAE centre
Mastocytosis	Sigurd Broesby Olsen, Carsten Bindslev-Jensen	Mastocytosis centre
Allergen component-based diagnostics in food allergy	Esben Eller, Carsten Bindslev-Jensen	Allergy
Basophilic activation	Sidsel Falkencrone, Per Stahl Skov, Carsten Bindslev-Jensen	Allergy
Penicillin allergy	Janni Hjortlund, Carsten Bindslev-Jensen, Charlotte Mørtz	Drug allergy
Melanoma diagnosis	Henrik Lorentzen	Skin cancer
Compositae allergy	Evy Paulsen, Klaus Ejner Andersen	Contact dermatitis
DARC (Danish Allergy Research Centre)	Carsten Bindslev-Jensen, Klaus Ejner Andersen, Esben Eller	Allergy, contact dermatitis and atopic diseases
TOACS (The Odense Adolescence Cohort Center)	Charlotte G Mørtz, Klaus Ejner Andersen, Carsten Bindslev-Jensen	Allergy, contact dermatitis and atopic diseases
Allergic reactions to acetylsalicylic acid and non-steroidal anti-inflammatory drugs (NSAID)	Carsten Bindslev-Jensen	Allergy and intolerance
Xolair (omalizumab) treatment of urticaria	Carsten Bindslev-Jensen	Urticaria
Stability of contact allergens	Klaus Ejner Andersen, Kristian Fredløv Mose	Contact dermatitis and Allergen Bank
Immunotherapy in food allergy (Food Allergy Specific Therapy (FAST), European Union (EU) programme)	Carsten Bindslev-Jensen	Allergy
EUSCLE (European Society of Cutaneous Lupus Erythematosus)	Anette Bygum, Rasa Laurinaviciene	Autoimmune skin diseases

The staff at the Dermato-Venereology and Allergy Centre at Odense University Hospital.

Hereditary angioedema

The department hosts the national Danish centre for diagnosis and treatment of hereditary angioedema. This disease occurs in families who have all experienced deaths of family members due to laryngeal oedema. The families are identified and investigated through research initiatives from the department, and the centre provides counselling for patients 24 h a day. This includes early diagnosis, eventually prenatally, early training in self-care, and the generation of focus groups.Treatment of acute attacks consists of parenteral administration of the missing enzyme (C1 inhibitor) or a bradykinin B2 receptor antagonist, which is available only in a few emergency departments in the country.

Mastocytosis

Mastocytosis affects approximately 0.1–0.8% of the population, and is probably underdiagnosed. It is a heterogeneous disease that affects children and adults differently. Childhood cases are often mild and most regress spontaneously. Ninety-five percent or more of adult cases have the systemic form with increased risk of developing severe allergic reactions and osteoporosis, in addition to often debilitating mediator-related symptoms. Rarely more severe forms of mastocytosis occur. A coordinated, multidisciplinary approach is essential.

A centre, MastOUH (www.mastocytose.dk), has been established in collaboration with haematology, endocrinology, pathology, radiology, paediatrics, gastroenterology and

the group around Professor Marcus Maurer, Department of Dermatology, Charité Hospital Berlin, to perform mastocytosis research. The centre is included as a Centre of Excellence under the European Competence Network on Mastocytosis (ECNM).

Skin cancer

The Skin Cancer Clinic sees patients with suspected skin cancer within 48 h. The clinic has an established collaboration with the Department of Genetics for screening and detection of patients with dysplastic naevus syndrome and familial malignant melanoma.

A special clinic has been established for organ transplant patients with increased risk of developing skin malignancies. There is established collaboration with the Department of Nephrology for systematic screening of kidney transplant patients (33% develop skin cancer 10 years after transplant). There is close collaboration with the region's oncology and plastic surgery departments for optimal patient care.

European Society of Cutaneous Lupus Erythematosus (EUSCLE)

Since 2006 the department has participated in the European Society of Cutaneous Lupus Erythematosus (EUSCLE) and registered patients to facilitate research and awareness of cutaneous lupus in order to develop diagnostic and therapeutic guidelines.

Sexually transmitted diseases

The department participates in the development of new methods for early and effective contact with young people at risk of contracting a sexually transmitted disease. This involves the development of new forms of communication. The department has a free access clinic for diagnosis and treatment of patients with suspected sexually transmitted diseases.

Other international and national collaboration

The faculty has contributed to research at the international level through the EU's Fifth Framework Programme (Fragrance chemical allergy: a Major Environmental and consumer problem in Europe), the EU's Sixth Framework Programme (Global Allergy and Asthma European Network, Ga2len) and the EU's Seventh Framework program (Project FAST (Food Allergy Specific Therapy) and Project "Medall" and the European Society for Cutaneous Allergy and Contact Dermatitis (http://www.escd.org/aims/).

The department is represented in the European and Environmental Contact Dermatitis Research Group (EECDRG) and the International Contact Dermatitis Research Group (ICDRG). The department is the national Danish Centre for hereditary angioedema and contributes to research projects on this serious disorder. Collaboration is established with Swedish researchers concerning the genetic classification of Danish patients with hereditary ichthyosis. Since 2006 the department has contributed to research, initiated by the European Society of Cutaneous Lupus Erythematosus (EUSCLE).

The department is participating in the European collaboration concerning malignant skin tumours with a focus on malignant melanoma and skin cancer in organ transplant patients (SCOPE). The mastocytosis centre is included as a Centre of Excellence under the ECNM.

Further information about the department

General information: http://www.sdu.dk/Om_SDU/Institutter_centre/Klinisk_institut/Forskning/Forskningsenheder/Dermato-Venerologi%20og%20Allergi.aspx?sc_lang=en.

Recent and current PhD projects: http://www.sdu.dk/Om_SDU/Institutter_centre/Klinisk_institut/Forskning/Forskningsenheder/Dermato-Venerologi+og+Allergi/Ph,-d-,d,-d-,-projekter.

Recent publications: http://www.sdu.dk/Om_SDU/Institutter_centre/Klinisk_institut/Forskning/Forskningsenheder/Dermato-Venerologi+og+Allergi/Forskningspublikationer.

Dermato-Venereology and Allergy Centre at Odense University Hospital.

Facts

The Odense University was founded in 1966. The Department of Dermatology and Venereology appointed its first Professor in 1968. The Faculty today encompasses around 1,900 students, 40 professors and 150 university teachers and researchers, and 280 other staff.

The group of researchers at the Unit of Dermatology and Venereology at Odense University hospital consists of:

2 professors
4 associate professors
3 PhD students
1 Post Doc
4 medical students

The group publishes approximately 50–60 original articles per year. Eight theses have been published by the group during the past years.